What is claimed is:

1. A magnetic sensor comprising:

a first ferromagnetic film;

a conductor which intersects the first ferromagnetic film via a first intermediate layer;

a current circuit structure which is connected so as to cause a current to flow from the first ferromagnetic layer to the conductor;

a second ferromagnetic film which is formed on the conductor in an intersecting manner via a second intermediate layer and which generates a signal of voltage changing according to a change in an external magnetic field;

a voltage change amplifier film which contains materials whose resistance changes nonlinearly due to voltage; and

an electrode which is connected to the voltage change amplifier film.

2. A magnetic sensor comprising:

a first ferromagnetic film;

a conductor which intersects the first ferromagnetic film via a first intermediate layer;

a current circuit structure which is connected so as to cause a current to flow from the first ferromagnetic layer to the conductor;

a second ferromagnetic film which is formed on the conductor in an intersecting manner the conductor via a second intermediate layer and which generates a signal of voltage changing by a change in an external magnetic field;

a voltage change amplifier film which converts the signal of voltage changing to a change in electrical resistance and amplifies the signal intensity of the change in electrical resistance; and

an electrode which is connected to the voltage change amplifier film.

3. The magnetic sensor according to claim 1, wherein the electrode causes a current to flow to the voltage change amplifier film.

4. The magnetic sensor according to claim 2, wherein the electrode causes a current to flow to the voltage change amplifier film.

5. The magnetic sensor according to claim 1, wherein the conductor has a shape which is elongated in a direction substantially opposite to a current direction in the current circuit.

6. The magnetic sensor according to claim 2, wherein the conductor has a shape which is elongated in a direction substantially opposite to a current direction in the current circuit.

7. The magnetic sensor according to claim 1, wherein the resistance change amplifier film is formed on the side of a surface not in contact with the second magnetic film.

8. The magnetic sensor according to claim 2, wherein the resistance change amplifier film is formed on the side of a surface not in contact with the second magnetic film.

9. The magnetic sensor according to claim 1, wherein the first ferromagnetic film, in all thereof or at least in a portion where the first ferromagnetic film is in contact with the conductor, is formed from a material having a larger coercive force than in the second ferromagnetic film or is a structure having a larger coercive force due to a difference in film thickness and shape even with the same material.

10. The magnetic sensor according to claim 2, wherein the first ferromagnetic film, in all thereof or at least in a portion where the first ferromagnetic film is in contact with the conductor, is formed from a material having a larger coercive force than in the second ferromagnetic film or is a structure having a larger coercive force due to a difference in film thickness and shape even with the same material.

11. The magnetic sensor according to claim 1, wherein the direction of magnetization of the first ferromagnetic film is pinned by a film formed from an antiferromagnetic material.

12. The magnetic sensor according to claim 2, wherein the direction of magnetization of the first ferromagnetic film is pinned by a film formed from an antiferromagnetic material.

13. The magnetic sensor according to claim 1, wherein the voltage change amplifier film contains a material of Perovskite structure having a composition consisting of $RBMnO_3$ (R: rare earth element, B: alkaline element) at room temperature.

14. The magnetic sensor according to claim 2, wherein the voltage change amplifier film contains a material of Perovskite structure having a composition consisting of $RBMnO_3$ (R: rare earth element, B: alkaline element) at room temperature.

15. In a magnetic head having a reader device,

the reader device comprising: a first ferromagnetic film, a conductor which intersects the first ferromagnetic film via a first intermediate layer, a current circuit structure which is connected so as to cause a current to flow from the first ferromagnetic layer to the conductor, a second ferromagnetic film which is formed on the conductor in an intersecting manner via a second intermediate layer and which generates a signal of voltage changing according to a change in an external magnetic field, a voltage change amplifier film which contains materials whose resistance changes nonlinearly due to voltage, and an electrode which is connected to the voltage change amplifier film.

16. In a magnetic head having a reader device,

the reader device comprising: a first ferromagnetic film, a conductor which intersects the first ferromagnetic film via a first intermediate layer, a current circuit structure which is connected so as to cause a current to flow from the first ferromagnetic layer to the conductor, a second ferromagnetic film which is formed on the conductor in an intersecting manner via a second intermediate layer and which generates a signal of voltage changing according to a change in an external magnetic field, a voltage change amplifier film which converts the signal

of voltage changing to a change in electrical resistance and amplifies the signal intensity of the change in electrical resistance, and an electrode which is connected to the voltage change amplifier film.